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AIRS Simulations and Radiance Bias Estimates

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AIRS Simulations

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- AIRS simulation system is aimed at simulating AIRS/AMSU/HSB observations with high fidelity
  - Based on AVN forecast, trace gas climatologies, and realistic surface properties (point of contact: Evan Fishbein at JPL)
  - Global simulations for 24 hour data period targeted
    - to support AIRS Team Exercises
    - to stimulate AIRS Team toward handling large data sets
    - to test data flow in processing system
    - to evaluate algorithm performance
  - Lessons learned
    - Extremely useful (sizing resources, driving analysis tool design,…)
    - As complex as this is, it has limited realism
    - Uncovered many problems in the data flow
  - Caveat: make sure you learn the right lessons

Limitation: Cloud fractions in two layers are correlated for some AMSU footprints

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Radiance Biases

- Several clear sky detection methods being tested and evaluated
  - Susskind/Goldberg/Gautier are following separate thrusts
  - Last Team Exercise (1/22/2001) tested each method
    - Only Susskind method implemented for last exercise in L2_PGE
    - Others now in place for next Team Exercise
- How well did this work?
- Or more importantly, what did it imply about uncertainties in radiance bias estimates?

  $\Delta\text{Radiance(Truth - Calculated)}_{\text{clear\_flag}}$
- BASED ON CURRENT SIMUALTION AND EARLIER RETRIEVALS…….

Radiance bias figure captions

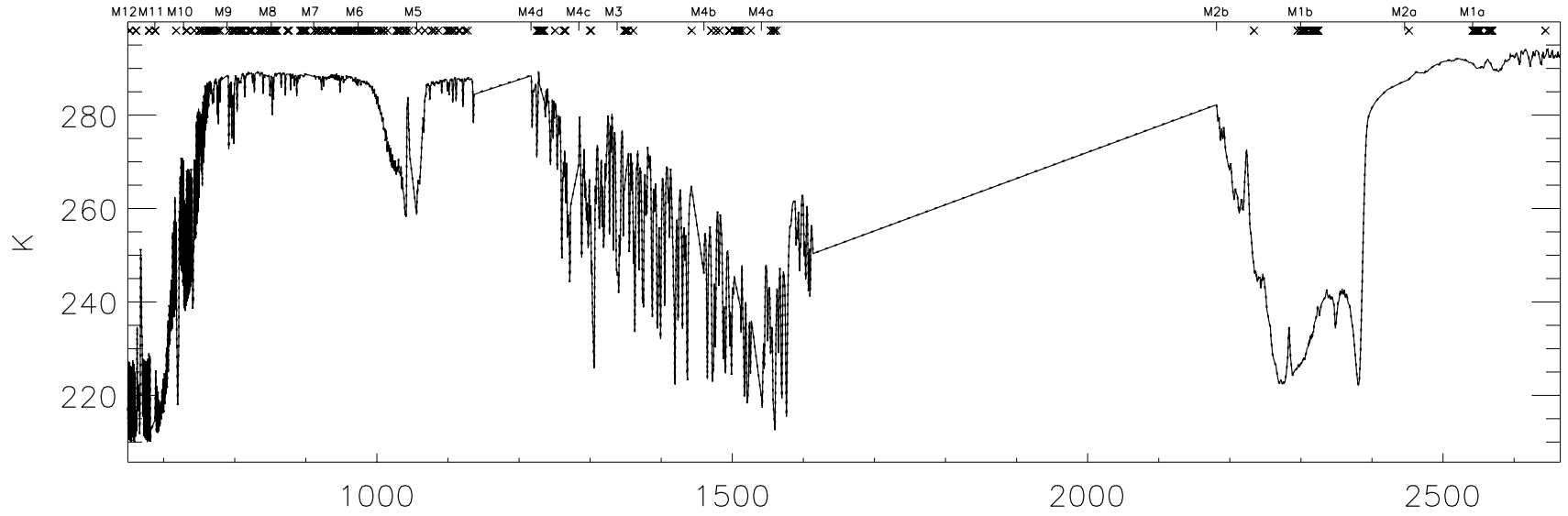
1. **Bias and rms difference in radiances computed where the clear flag was set compared to radiances computed from the input state (with no clouds).**
2. **As above. Those cases where the clear flag was set and were identified as clear in the simulation input (truth).**
3. **As above. Those cases which were identified as clear but the simulation input (truth) identified as being contaminated by clouds.**

Note:

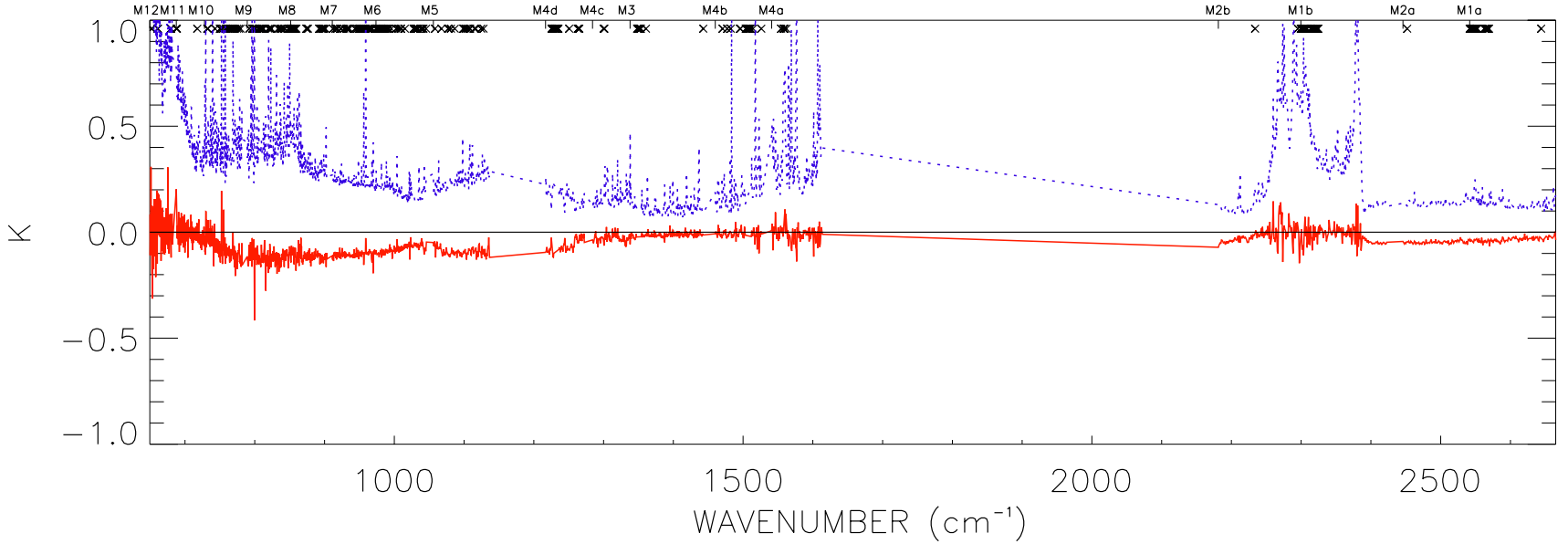
- **Results from early simulations used more stringent clear flag (hence low yield)**
- **The early (pre-May 2001) modeling of the variability of multiple layer cloud fractions between AIRS footprints has been shown to present pathological problems in cloud-clearing for a significant percentage of retrievals**

With CC Leakage; G-401; 1.8% of 7200 AIRS Retrievals Stats

Averaged Spectrum



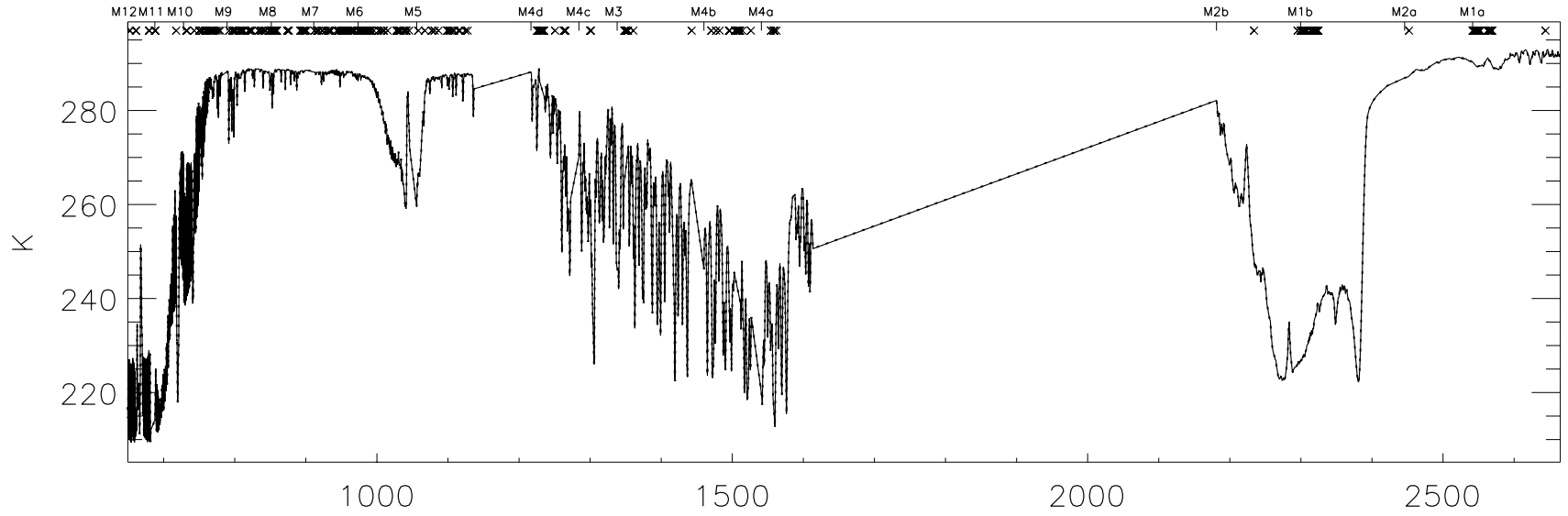
Bias; ..... SDev



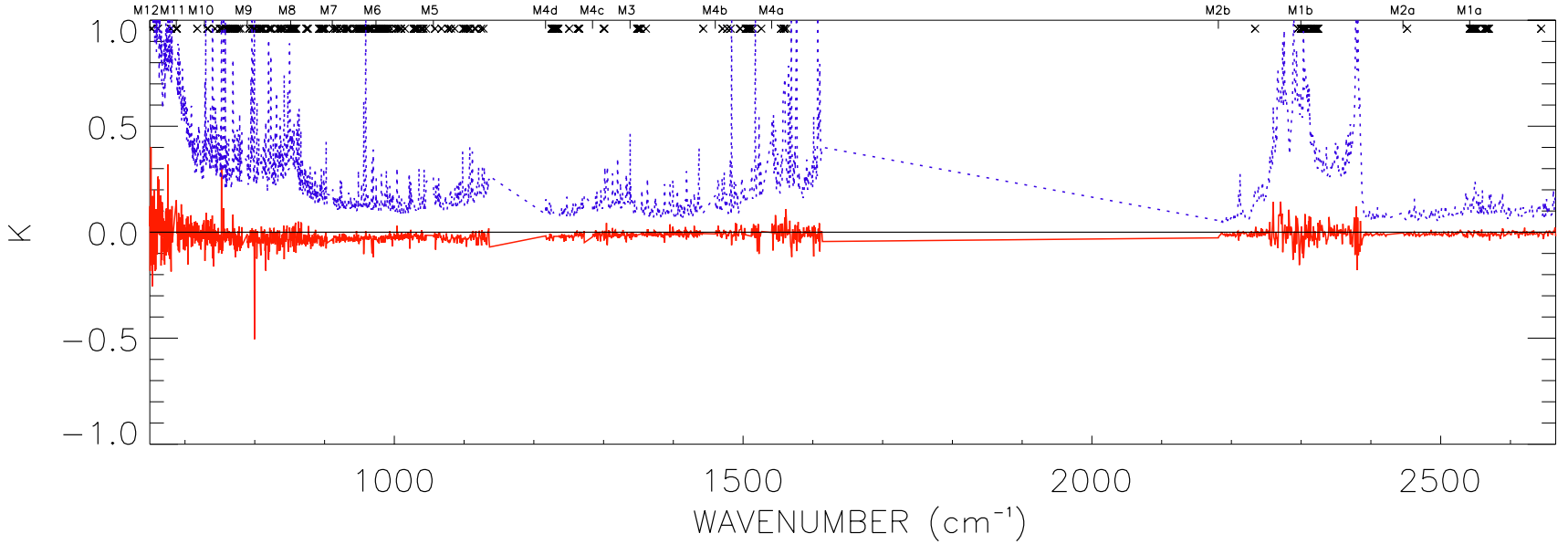
____ File_1: /home/lc/AIRS/RUN/test/Granule-401/L1B-AIRS-Rad
..... File_2: /home/lc/AIRS/RUN/test/Granule-401/L1B-AIRS-Rad_Truth

No CC Leakage; G−401; 1.4% of 7200 AIRS Retrievals Stats

Averaged Spectrum



Bias; ..... SDev



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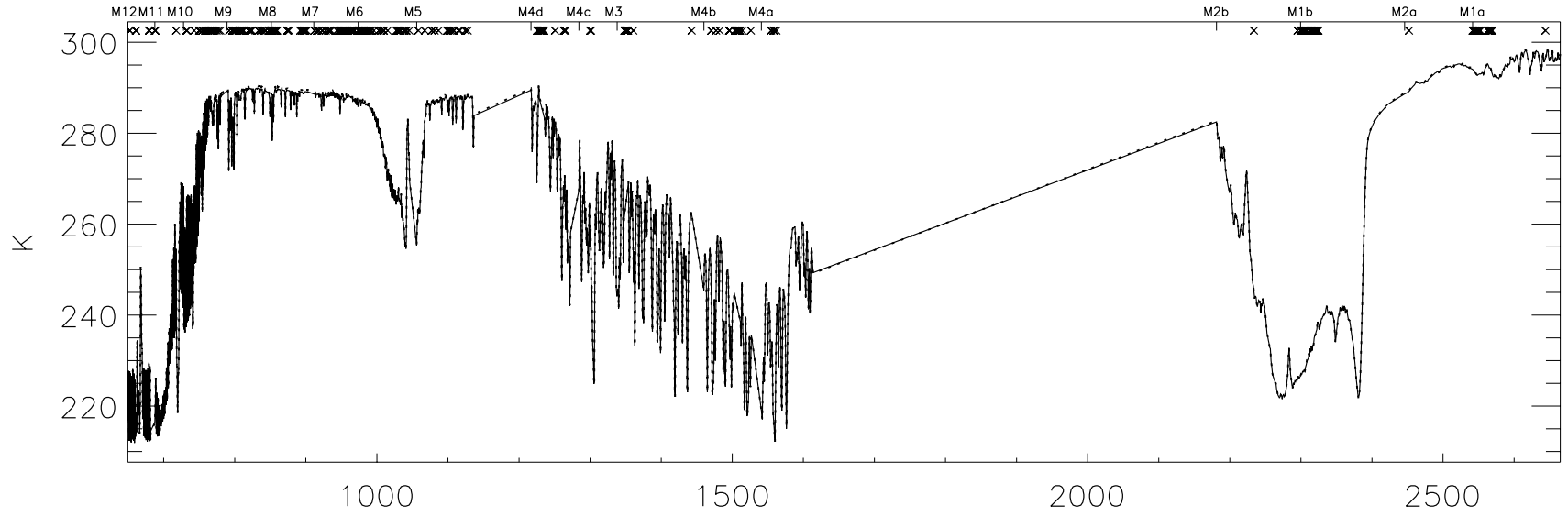
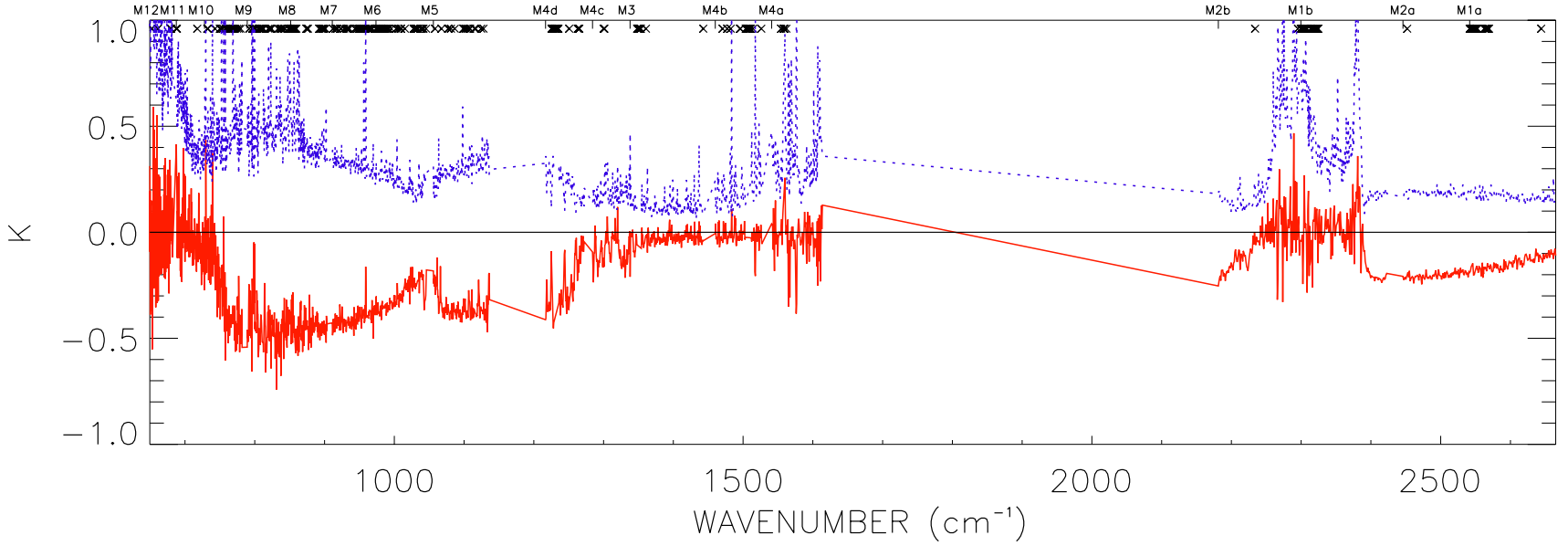
File_2: /home/lc/AIRS/RUN/test/Granule−401/L1B−AIRS−Rad_Truth

CC Leakage ONLY; G−401; 0.3% of 7200 AIRS Retrievals Stats

Averaged Spectrum



Bias; ..... SDev



____ File_1: /home/lc/AIRS/RUN/test/Granule−401/L1B−AIRS−Rad
..... File_2: /home/lc/AIRS/RUN/test/Granule−401/L1B−AIRS−Rad_Truth